NATURAL RESOURCES CONSERVATION SERVICE

CONSERVATION PRACTICE STANDARD

NUTRIENT MANAGEMENT

(Ac.)

CODE 590

DEFINITION

Managing the amount, source, placement, form and timing of the application of nutrients and soil amendments.

PURPOSES

- To budget and supply nutrients for plant production
- To properly utilize manure or organic by-products as a plant nutrient source
- To minimize agricultural non-point pollution of surface and ground water resources
- To protect air quality by reducing nitrogen emissions (ammonia and NOx compounds) and the formation of atmospheric particulates
- To maintain or improve the physical, chemical and biological condition of the soil

CONDITIONS WHERE PRACTICE APPLIES

This practice applies to all lands where plant nutrients and soil amendments are applied.

CRITERIA

General Criteria Applicable to All Purposes

A nutrient budget for nitrogen, phosphorus and potassium shall be developed that considers all significant sources including, but not limited to, animal manure and organic and non-organic by-products, waste water, commercial fertilizers, crop residues, legume credits and irrigation water. Nutrient budgets shall be developed using the Nutrient Management Job Sheet, Table 2, contained in Exhibit 1 of this standard.

Realistic yield goals shall be established based on soil productivity information, historical yield data, climatic conditions and level of management. Rates of nutrient application established by the LSU Agricultural Center will be adjusted according to yield goals. In Louisiana, expected yields will be based on the past five crop years. To estimate expected yields, eliminate the extreme low and high yields and take the average of the three remaining yields. Add five percent to the average for prospective favorable weather conditions. For new crops or varieties, industry recommendations may be used until research recommendations are available.

Plans for nutrient management shall specify the form, source, amount, timing and method of application of nutrients on each field to achieve realistic yield goals while minimizing nitrogen and/or phosphorus movement to surface and/or ground waters.

Erosion, runoff and water management control shall be installed, as needed, on fields where nutrients are applied.

Soil and Tissue Sampling and Laboratory Analyses (Testing). Nutrient planning shall be based on current soil and tissue (where used as a supplement) test results developed in accordance with LSU Agricultural Center's Soil Testing and Plant Analysis Laboratory (STPAL) guidance. Current soil test results are those that are no older than three (3) years old, or in the case of sugarcane, no older than the length of the rotation. Soil samples shall be taken every three (3) years or at the beginning of a different cropping rotation,

whichever is longer (i.e., sugarcane fallow year).

A minimum of one composite soil sample should be submitted for each combination of soils, crops-forages, and management systems on the farm or ranch. Each composite sample should be composed of 20-30 (no less than 10) cores take at random from the area the sample represents. Soil should be collected from a 0-6 inch level. The sub-samples should be mixed thoroughly. Approximately one (1) pint of the mixed sub-samples labeled with the field number and accompanied by a completed information sheet should be submitted for laboratory analysis.

Soil and tissue analyses performed by laboratories other than the LSU Agriculture Center's STPAL shall be performed by laboratories that are accepted in one or more of the following:

- Laboratories successfully meeting the requirements and performance standards of the North American Proficiency Testing-Performance Assessment Program (NAPT-PAP), or
- State recognized program that considers laboratory performance and proficiency to assure accuracy of soil test results.

Soil testing shall include analysis for nutrients for which specific information is needed to develop the nutrient plan. **Basic analysis plus organic matter are the minimum soil test requirements for Louisiana**. Soil analysis for nitrogen in humid environments is thought by most scientists to be unreliable and is not required.

Nutrient Application Rates. Soil amendments shall be applied, as needed, to adjust soil reaction (pH) to the specific range of the crop for optimum availability and utilization of nutrients.

Nutrient application rates shall be based on LSU Agricultural Center recommendations that consider current soil test results, soil texture, realistic yield goals and management capabilities. In cases where the STPAL does not provide specific recommendations, applications shall be based on realistic yield goals and associated plant nutrient uptake rates.

Nutrients shall be applied to either optimize yield or replace nutrients removed from the production system in harvested biomass. Nutrients are applied at optimum rates when the producer wishes to maximize production or when soil test levels for phosphorus and/or potassium are less than medium (low or very low) on cropland or there is less than 60 percent vegetative cover of desirable/management species on grazing lands. Listed below are criteria for nutrient application at optimum rates:

- Nitrogen Application – Planned nitrogen application rates shall match the recommended rates as closely as possible, except when manure or organic by-products are used as a source of nutrients. When manure or organic by-products are a source of nutrients, see "Additional Criteria" below.
- Phosphorus Application – Planned phosphorus application shall match the recommended rates as closely as possible, except when manure or other organic by-products are a source of nutrients. When manure or organic by-products are a source of nutrients, see "Additional Criteria" below.
- Potassium Application – Excess potassium shall not be applied in situations where it causes unacceptable nutrient imbalances in crops or forages. Manage potassium application on forages so that the potassium content does not exceed 2-2.5 percent.
- Other Plant Nutrients – The planned rates of secondary and micro-nutrients shall be consistent with LSU Agricultural Center recommendations.
- Starter Fertilizers – Starter or "Pop-up" fertilizers containing nitrogen, phosphorus and potassium may be applied according to LSU Agricultural Center recommendations. In certain crops, starter fertilizer may be recommended because of a yield response even when soil nutrient levels are sufficient.

Nutrients may be applied at replacement rates when soil test phosphorus and/or potassium levels are medium or higher on cropland or there is at least 60 percent vegetative cover of desirable/management species on grazing land. Instructions for calculating nutrient replacement for cropland, hayland, and grazing land are included in Louisiana Agronomy Technical Note 92.

Nutrient Application Timing. Timing of nutrient application shall correspond as closely as possible with plant nutrient uptake characteristics, taking into consideration cropping systems, weather and climate conditions, risk assessment tools (e.g., leaching index, P index) and field accessibility.

Nutrient Application Methods. Application methods that reduce the risk of transport to surface and ground water or into the atmosphere shall be used. To minimize application losses:

Apply nutrients uniformly to the application area(s).

- Do not apply nutrients to saturated soil if the potential for runoff exists.
- Apply nutrients according to plant growth habits, irrigation practices, and other conditions so as to maximize availability to the plant and minimize the risk of runoff, leaching, and volatilization losses.
- Nutrients applied through irrigation systems (fertigation) shall be applied in accordance with the requirements of Irrigation Water Management (Code 449).

Conservation Management Unit (CMU) Risk Assessment. In areas with identified or designated nutrient-related water quality impairment, a CMU-specific risk assessment of the potential for nutrient transport from the area shall be completed (e.g., leaching index, P index).

Additional Criteria Applicable to Manure, Organic By-Products, or Biosolids Applied as a Plant Nutrient Source

When animal manure or other organic by-products are applied, a risk assessment of the potential for phosphorus transport from the CMU shall be completed using the Phosphorus Index.

Nutrient values of manure and organic by-products (excluding sewage sludge or biosolids) shall be determined prior to land application based on current laboratory analysis. Current manure analyses are no older than one year.

Preliminary planning decisions may be based on "book values" acceptable to NRCS and/or LSU Agricultural Center if they accurately estimate the content of the material. Book values recognized by NRCS may be found in the Agricultural Waste Management Field Handbook, Chapter 4 – Agricultural Waste Characteristics. Plans shall be adjusted accordingly after wastes have been analyzed.

Biosolids (sewage sludge) shall be applied in accordance with USEPA regulations (40 CFR parts 403 and (pretreatment) and 503 (Biosolids) and other state and/or local regulations regarding the use of biosolids as a nutrient source.

The planned rates of nitrogen and phosphorus application in the final plan shall be determined based on annual laboratory analysis of the material being applied minus adjustments for volatilization, leaching and denitrification.

Manure and Organic By-Product Nutrient Application Rates. The application rate (in/hr) for nutrients applied through irrigation shall not exceed the soil infiltration-intake rate. The total application shall not exceed the field capacity of the soil.

The planned rates of nitrogen and phosphorus application recorded in the plan shall be determined based on the following guidance:

Nitrogen Application

- When manure or other organic by-products are used, the nitrogen availability of the planned application rates shall match plant uptake characteristics as closely as possible, taking into account the timing of the nutrient application(s) in order to minimize leaching and atmospheric losses.
- Management activities and technologies shall be used that

minimize nitrogen losses through denitrification and ammonia volatilization.

- Manure or other organic by-products may be applied on legumes at rates equal to the estimated removal of nitrogen in harvested plant biomass. Plant nutrient removal rates may be found in the Agricultural Waste Management Field Handbook, Chapter 6 – Role of Plants in Waste Management.
- When the nutrient management plan component is being implemented on a phosphorus basis, manure and other organic by-products shall be applied at rates consistent with a phosphorus limited application rate. In such situations, an additional nitrogen application from an inorganic source may be required to supply, but not exceed, the recommended amount of nitrogen in any given year.

Phosphorus Application

- When manure or other organic by-products are used, the planned rates of phosphorus application shall be based on the vulnerability of phosphorus movement off-site. In Louisiana, the Phosphorus Index (PI) Rating shall be used to determine the potential for phosphorus movement off-site. When the PI is used, phosphorus may be applied at rates consistent with Table 1.

TABLE 1

PHOSPHORUS INDEX

Rating	Phosphorus Application
Low Risk	Nitrogen Based
Medium Risk	Nitrogen Based
High Risk	Phosphorus Based (e.g. crop removal)
Very High Risk	Phosphorus Based (e.g. no application)

- A single application of phosphorus applied as manure may be made at a rate equal to the recommended phosphorus removal in harvested plant biomass for the crop rotation or multiple years in the crop sequence. When such applications are made, the application rate shall:
  - ◊ Not exceed the recommended nitrogen application rate during the year of application, or
  - ◊ Not exceed the estimated nitrogen removal in harvested plant biomass during the year of application when there is no recommended nitrogen application,
  - ◊ Not be made on sites considered vulnerable to off-site phosphorus transport unless appropriate conservation practice, best management practices or management activities are used to reduce the vulnerability.

Field Risk Assessment. When animal manure or other organic by-products are applied, a field specific assessment of the potential for phosphorus transport from the field shall be completed. In Louisiana, this assessment shall be done using the Phosphorus Index contained in Exhibit 2 of this standard.

The results of the assessment shall be discussed with the producer and documented in the plan.

Heavy Metals Monitoring. When sewage sludge (biosolids) is applied, the accumulation of potential pollutants (including arsenic, cadmium, copper, lead, mercury, selenium and zinc) in the soil shall be monitored in accordance with the US Code, Reference 40 CFR, Parts 403 and 503, and/or applicable state and local laws or regulations.

Producers using poultry litter as a source of nutrients should be especially careful about copper and zinc buildups in their soils. They are included in poultry feed as medication. They can accumulate in the soil and should be monitored closely. Refer to Table 2.

TABLE 2 –

MAXIMUM SOIL LOADING RATES FOR ZINC AND COPPER

	SOIL C. E. C. (MEG/LOOG)		
	Less Than		More Than
	5.0	**5.0 – 15**	**15**
	(sandy soils)	***(loamy soils)***	***(clayey soils)***
	———	pounds per acre	———
Zinc	**250**	**500**	**1,000**
Copper	**125**	**250**	**500**

Long time litter applications shall not exceed these loading rates. In addition, monitor copper and zinc levels by soil testing to make sure crop toxicity is avoided.

Additional Criteria to Minimize Agricultural Non-Point Source Pollution of Surface and Ground Water Resources

In areas with identified or designated nutrient related water quality impairment, an assessment shall be completed of the potential for nitrogen and/or phosphorus transport from the field. The Leaching Index (LI) and Phosphorus Index (PI) are the recognized assessment tools used to make the assessments. The LI is contained in Section II-3 of the NRCS Field Office Technical Guide (FOTG), Leaching Index for Nitrogen, along with soils information necessary to identify the potential for nitrogen loss. Assessment results and recommendations shall be discussed with the producer and documented in the plan.

Plans developed to minimize agricultural non-point source pollution of surface and ground water resources shall include practices and/or management activities that can reduce the risk of nitrogen or phosphorus movement from the field.

Additional Criteria to Protect Air Quality by Reducing Nitrogen and/or Particulate Emissions to the Atmosphere

In areas with identified nutrient management related air quality concerns, any component(s) of nutrient management (i.e., amount, source placement, form, timing of application) identified by risk assessment tools as a potential source of atmospheric pollutants shall be adjusted, as necessary, to minimize loss(es).

When not using a minimum tillage option, surface application of manure and fertilizer nitrogen formulations that are subject to volatilization (e.g., urea) shall be incorporated into the soil within 24 hours of application.

When applying liquid forms of manure with irrigation equipment, operators will select application conditions when there is high humidity, low barometric pressure, little/no wind blowing, and/or other conditions that will minimize volatilization losses.

Operators will handle and apply poultry litter or other dry types of animal manures when the potential for wind driven loss is low and there is less potential for transport of particulates into the atmosphere.

Weather and climatic conditions during manure or organic by-product application(s) shall be recorded and maintained in accordance with the operation and maintenance section of this standard.

Additional Criteria to Improve the Physical, Chemical and Biological Conditioning of the Soil

Nutrients shall be applied in such a manner as not to degrade the soil's structure, chemical properties or biological condition. Use of nutrient sources with high percent of soluble salts will be minimized unless provisions are used to leach salts below the crop root zone.

Nutrients shall not be applied to flooded or saturated soils when the potential for soil compaction and creation of ruts is high.

CONSIDERATIONS

Avoid induced deficiencies of nutrients due to excessive levels of the other nutrients.

Consider additional practices such as Conservation Cover (327), Grassed Waterways (412), Filter Strips (393), Irrigation Water Management (449), Riparian Forest Buffer (391), Conservation Crop Rotation (328), Cover Crop (340) and Residue and Tillage Management (329, 345, 346 and 344) to improve soil nutrient and water storage, infiltration, aeration, tilth, diversity of soil

organisms and to protect or improve soil and water quality.

Use cover crops whenever possible to utilize and recycle residual nitrogen.

Consider application methods and timing that reduce the risk of nutrients being transported to ground and surface waters, or into the atmosphere. These include:

- side dress application of nitrogen to provide nutrients at the time of maximum crop utilization for best efficiency,
- eliminating winter application of nitrogen for spring seeded crops,
- banded application of phosphorus near the seed row,
- applying nutrients uniformly to specified areas or as prescribed by precision agricultural techniques, and/or
- immediate incorporation of land applied manures or other organic by-products on annually tilled crops or sugarcane,
- delaying field application of animal manures or other organic by-products if precipitation capable of producing runoff and erosion is forecast within 24 hours of the time of the planned application.

Follow minimum application set back distances from environmentally sensitive areas listed in Exhibit 2 of the conservation practice standard Waste Utilization (633) when applying nutrients in the form of animal manure or other organic by-products.

Consider the potential problem from odors associated with the land application of animal manure, especially when applied near or upwind of residences, roads or public areas.

Avoid nitrogen volatilization losses associated with the surface application of animal manures or urea based fertilizer by soil incorporation immediately after application.

Consider the potential to affect National Register listed or eligible cultural resources.

Consider using soil test information no older than one (1) year when developing new plans, particularly if animal manures are to be a nutrient source.

Consider annual reviews to determine if changes in the nutrient budget are desirable (or needed) for the next crop.

On sites for which there are special environmental concerns consider other sampling techniques.

Consider ways to modify the chemistry of animal manure, including modification of the animal's diet to reduce the manure nutrient content, to enhance the producer's ability to manage manure effectively.

PLANS AND SPECIFICATIONS

Specifications shall be prepared for each field according to the Criteria and Operations and Maintenance described in this standard and recorded in narrative statements in the Conservation/Nutrient Management Plan. Plans and specifications shall describe the requirements for applying this practice to achieve its intended purpose(s), using nutrients to achieve production goals and to prevent or minimize water quality impairment.

Nutrient management plans should include as a minimum:

- aerial photograph or map and a soil map of the site,
- current and/or planned plant production sequence or crop rotation (may vary according to commodity prices) results of soil, plant, water, manure or organic by-product sample analysis,
- realistic yield goals for the crops in the rotation,
- quantification of all nutrient sources,
- recommended nutrient rates, timing, form and method of application and incorporation,
- location of designated sensitive areas or resources and the associated nutrient management restriction and
- complete nutrient budget for nitrogen, phosphorus and potassium for the rotation or crop sequence.

If increases in soil phosphorus are expected, plans should document:

- the soil phosphorus level at which it may become necessary to convert to a phosphorus based implementation,
- the relationship between soil phosphorus levels and the potential for phosphorus transport from the field and
- the potential for soil phosphorus drawdown from the production and harvesting of crops.

When applicable, plans shall include other practices or management activities as determined by specific regulations, program requirements or producer goals.

In addition to the requirements described above, plans for nutrient management shall also include:

- discussion about the relationship between nitrogen and phosphorus transport and water quality impairment. The discussion about nitrogen should include information about nitrogen leaching into shallow ground water and potential health impacts. The discussion about phosphorus should include information about phosphorus accumulation in the soil, the increased potential for phosphorus transport in soluble form and the types of water quality impairment that could result from phosphorus movement into surface water bodies.
- discussion about how the plan is intended to prevent the nutrients (nitrogen and phosphorus) supplied for production purposes from contributing to soil and water quality impairment.
- a statement that the plan was developed based on the requirements of current standard and any applicable Federal, state or local regulations or policies; and that changes in any of these requirements may necessitate a revision of the plan.

OPERATION AND MAINTENANCE

The owner/client is responsible for the proper implementation of this practice including operation and maintenance of all equipment. Operation and maintenance shall address the following:

- Plans shall be reviewed periodically to determine if adjustments or modifications to the plan are needed. As a minimum, plans will be reviewed every three (3) years to coincide with the soil test cycle and revised if necessary.
- Fertilizer, animal manure and other organic by-products shall be protected from weather, accidental leakage or spillage.
- Fertilizer applicators and manure spreaders shall be calibrated to ensure uniform application of material at planned rates.
- Actual rate of nutrients applied shall be documented. When the actual rate applied differs from the recommended and planned rates, record will indicate the reasons for the differences.

Records shall be maintained to document plan implementation. As applicable, records shall include:

- soil test results and recommendations for nutrient application,
- annual manure or organic by-product sample analysis and results of water and/or plant tissue analysis,
- quantities, analysis and sources of nutrients applied,
- crops planted, planting and harvesting dates, yields and crop residue removed,
- dates of plan reviews, name of person performing the review and recommendation resulting from the review.

Records shall be maintained for a period of five (5) years or longer if required by other Federal, state or local ordinances, or program or contract requirements.

Workers shall avoid unnecessary exposure to hazardous chemical fertilizer or organic by-products. Protective clothing, including goggles, a respirator, glasses and footwear shall be worn when handling potentially dangerous materials. Extra caution must be observed when handling ammonia or when dealing with organic wastes stored in unventilated enclosures.

Wastewater resulting from flushing application equipment shall be kept away from wells, streams, ponds or other water bodies and out of high runoff areas. Excess material should be collected and stored, field applied in an appropriate manner or returned to the supplier. Excess material shall not be applied to areas with a high potential risk of runoff or leaching.

Dispose of or recycle nutrient containers in accordance with state and local regulations. Follow all Federal, state and local regulations regarding the transport of fertilizers or organic by-products.

REFERENCES

Follett, R .F. 2001. Nitrogen Transformation and Transport Processes. Pp17-44, In R. F. Follett and J. Hatfield. (eds.). 2001. Nitrogen in the Environment; Sources, Problems, and Solutions. Elsevier Science Publishers. The Netherlands. 520 pp.

Sims, J. T. (ed.) 2005. Phosphorus: Agriculture and the Environment. Agron. Monogr. 46. ASA, CSSA, SSSA, Madison, WI.

Stevenson, F. J. (ed.) 1982. Nitrogen in Agricultural Soils. Agron. Series 22. ASA, CSSA, and SSSA, Madison, WI

EXHIBIT 1

NUTRIENT MANAGEMENT

Conservation Practice Job Sheet ***590***

Natural Resources Conservation Service (NRCS) **March 1999**

Landowner_____

Definition
Nutrient management is managing the source, rate, form, timing and placement of nutrients.

Purpose
Nutrient management effectively and efficiently uses scarce nutrient resources to adequately supply soils and plants to produce foods, forage, fiber and cover while minimizing environmental degradation.

Where Used
Nutrient management is applicable to all lands where plant nutrients and soil amendment are applied.

Conservation Management Systems
Nutrient management may be a component of a conservation management system. It is used in conjunction with Crop Rotation, Residue Management, Pest Management, conservation buffer practices and/or other practices needed on a site-specific basis to address natural resource concerns and the landowner's objectives. The major role of nutrient management is to minimize nutrient losses from fields, thus helping protect surface and ground water supplies.

Nutrient Management Planning
Nutrient management components of the conservation plan will include the following information:

- field map and soil map
- crop rotation or sequence
- results of soil, water, plant and organic material samples analyses
- expected yield
- sources of nutrients to be applied
- nutrient budget, including credits of nutrients available
- recommended nutrient rates, form, timing and method of application

- location of designated sensitive areas
- guidelines for operation and maintenance

Nutrient management is most effective when used with other agronomic practices, such as cover and green manure crops, residue management, conservation buffers, water management, pest management and crop rotation.

General Nutrient Management Considerations

- Test soil, plants, water and organic material for nutrient content.
- Set realistic yield goals.
- Apply nutrients according to soil test recommendations.
- Account for nutrient credits from all sources.
- Consider effects of drought or excess moisture on quantities of available nutrients.
- Use a water budget to provide timing of nutrient applications.
- Use cover and green manure crops where possible to recover and retain residual nitrogen and other nutrients between cropping periods.
- Use split applications of nitrogen fertilizer for greater nutrient efficiency.

Guidelines for Operation and Maintenance

- Review nutrient management component of the conservation plan annually and make adjustments when needed.
- Calibrate application equipment to ensure uniform distribution and accurate application rates.
- Protect nutrient storage areas from weather to minimize runoff and leakage.
- Avoid unnecessary exposure to fertilizer and organic waste, and wear protective clothing when necessary.
- Observe setbacks required for nutrient applications adjacent to waterbodies, drainageways and other sensitive areas.
- Maintain records of nutrient application as required by state and local regulations.
- Clean up residual material from equipment and dispose of properly.

Nutrient Management Assessment

Make a site-specific environmental assessment of the potential risk of nutrient management. The boundary of the nutrient management assessment is the agricultural management zone (AMZ), which is defined as the edge of field, bottom of root zone and top of crop canopy. Environmental risk is difficult to access beyond the AMZ.

Within an area designated as having impaired or protected natural resources (soil, water, air, water, plants and animals) the nutrient management plan should include an assessment of the potential risk for nitrogen and phosphorus to contribute to water quality impairment.

The Leaching Index (LI), Nitrogen Leaching and Economic Analysis Package (NLEAP), the Phosphorus Index (PI), erosion prediction models, water quality monitoring or any other acceptable assessment tools may be used to make risk assessments.

Evaluate other areas that might have high levels of nutrients, produced or applied, that may contribute to environmental degradation. For example, areas with high livestock concentrations or large areas of high intensity cropping, such as continuous potatoes, corn or specialty crops, may be contributing heavy nutrient loads to surface or ground water.

Conservation practices and management techniques will be implemented with nutrient management to mitigate any unacceptable risks.

EXHIBIT 1

Nutrient Management – Specification Sheet

Landowner _____ Field number _____

Assisted by _____ Date _____

Purpose (check all that apply)	
☐ Budget and supply nutrients for plant production	☐ Utilize manure/organic material as a nutrient source
☐ Minimize agricultural nonpoint source pollution (water quality)	☐ Maintain or improve soil condition

Table 1 Field Conditions and Recommendations

Crop sequence/rotation (circle current crop)					Expected Yield
Current soil test levels (ppm or lb/ac)					
N	**P**	**K**	**pH**	**S.O.M.%**	**EC**
Recommended nutrients/amendments to meet expected yield (lb/ac)					
N	**P_2O_5**	**K_2O**	**Lime**	**Other**	**Other**

Table 2 Nutrient Sources

Credits	N	P_2O_5	K_2O
		Pounds per acre	
1. Nitrogen credits from previous legume crop			
2. Residual from long-term manure application			
3. Irrigation water			
4. Other (e.g., atmospheric deposition)			
5. **Total credits**			

Plant-available nutrients applied to field		N		P_2O_5		K_2O	
(circle column that is landowner's decision)		Trial A	Trial B	Trial A	Trial B	Trial A	Trial B
6. Credits (from row 5, above)							
7. Fertilizer	Starter						
	Other						
8. Manure/organic material							
9.	Subtotal (sum of lines 6,7,and 8)						
10.	Nutrients recommended (from table 1)						
11.	Nutrient status (subtract line 10 from line 9)						

If line 11 is a negative number, this is the amount of additional nutrients needed to meet the crop recommendation.

If line 11 is a positive number, this is the amount by which the available nutrients exceed the crop requirements.

Nutrient Management Specifications						
Amount to be applied (lb/ac)	N		P_2O_5		K_2O	
Method, form and timing of application:						

NRCS, LA
OCTOBER 2007

EXHIBIT 1

Nutrient Management – Job Sketch

Draw or sketch the field, showing any sensitive areas and required setback zones. Inside each sketched field, enter total field acres and net application acres. Other relevant information, such as complementary practices or adjacent field or tract conditions may be included.

Scale 1"=_____ ft. (NA indicates sketch not to scale: grid size=1/2" by 1/2")

Perform the following operations and maintenance:
Review the nutrient management plan every _____ years.
Maintain field records for 5 years.
Calibrate application equipment to apply within +_____% of the recommended rate.
Handle all nutrient material with caution. Wear appropriate protective clothing.
Clean up residual material from equipment and dispose of properly.
Additional specifications and notes.

EXHIBIT 2

PHOSPHORUS SITE INDEX FOR LOUISIANA

Part A: Phosphorus loss potential due to site transport characteristics

CHARACTERISTICS	PHOSPHORUS LOSS RATING					FIELD VALUE
Soil Erosion (tons/acre)	2 X (soil loss t/a/y from RUSLE for year of application)					
Soil Runoff Class	very low	low	medium	high	very high	
(from Table I)	0	2	4	8	16	
Subsurface Drainage	very low	low	medium	high	very high	
(from Table 2)	0	2	4	8	16	
Distance from Edge of Field to Surface Water (feet)	>35 feet permanent vegetated buffer and no P application zone	10-35 feet vegetative buffer and >35 feet no P application zone	10-35 feet vegetated buffer	<10 feet from water and <35 feet no P application zone	<10 feet from water	
	0	2	4	8	16	
Priority of Receiving Water	very low	low	medium	high	very high	
	0	1	2	4	8	
				Total Site Value_____		

Part B: Phosphorus loss potential due to management practice

SITE CHARACTERISTICS	Phosphorus Loss Management					Field Value
	none	low	medium	high	very high	
Soil Test P Fertility Index Value	0.1 X PPM (Strong Bray from Melich III)					
P Fertilizer Application Rate (lbs. P_2O_5)	0.10 X (lbs. P_2O_5/acre)					
P Fertilizer Application Method	none applied	injected/banned below surface at least 2"	incorporated within 5 days of application	surface applied April-November or incorporated more than 5 days after application	Surface applied December-March	
	0	2	4	8	16	
Organic P Application Rate (lbs P_2O_5)	0.1 X (lbs. P_2O_5/acre) manure or compost					
	0.05 X (lbs. P_2O_5/acre) sludge					
Organic P Application Method	none applied	injected/banned below surface at least 2"	incorporated within 5 days of application	surface applied April-November or incorporated more than 5 days after application	Surface applied December-March	
	0	2	4	8	16	
					Total Management Value _____	

EXHIBIT 2

P INDEX WORKSHEET	
To solve for P loss rating, add all numbers on Part A and all numbers on Part B. Enter these numbers on the worksheet. Multiply Part A X Part B. This is your final P loss rating.	
Part A value _____ Part B value_____	
Multiply A X B = _____ = _____ P Loss Rating	
P Loss Rating	**Generalized Interpretation of P Loss Rating**
<600	**LOW potential for P movement from this site given current management practices and site characteristics. Low potential of an adverse impact to surface waters from P losses from this site. Nitrogen based nutrient management planning is satisfactory for this site. Soil P levels and P loss potential may increase in the future due to N-based nutrient management. Follow Agricultural Waste Land Applications Guidelines.**
600-1200	**MEDIUM potential for P movement from this site given current management practices and site characteristics. Nitrogen-based nutrient management is satisfactory for this site if practices are implemented to reduce P losses by surface runoff and erosion. Follow Agricultural Waste Land Applications Guidelines. Soil P levels and P loss potential may increase in the near future due to N-based nutrient management.**
1200-1800	**HIGH potential for P movement from this site given current management practices and site characteristics. Phosphorus-based nutrient management planning should be used for this site. Phosphorus applications should be limited to the amount expected to be removed from the field by crop harvest. Refer to AWMFHB, Chapter 6, or Exhibit 4 of the conservation practice standard Waste Utilization (633). Follow Agricultural Waste Land Applications Guidelines.**
>1800	**VERY HIGH potential for P movement from this site given current management practices and site characteristics. No phosphorus should be applied to this site. Active remediation techniques should be implemented in an effort to reduce P loss potential from this site.**

EXHIBIT 2

Table 1 - The Surface Runoff Class site characteristic determined from the relationship of the soil permeability class and field slope. Adapted from the soil survey manual (1993) Table 3-10.					
	Soil Permeability Class*				
Slope (%)	Very Rapid	Moderately Rapid and Rapid	Moderately Slow and Moderate	Slow	Very Slow
Concave**	N	N	N	N	N
<1	N	N	N	L	M
1-5	N	VL	L	M	H
5-10	VL	L	M	H	VH
10-20	VL	L	M	H	VH
>20	L	M	H	VH	VH

N = negligible **VL = very low** **L = low**
M = medium **H = high** **VL = very high**

Permeability class of the least permeable layer within the upper 39 inches (one meter) of the soil profile. Permeability classes for specific soils can be obtained from a published soil survey or from local USDA – NRCS field offices.

Soil Permeability Classes in inches per hour (in/hr):

very slow (<0.06 in/hr) **slow (0.06-.02 in/hr)**
moderately slow (0.2-0.6 in/hr) **moderate (0.6-2.00 in/hr)**
moderately rapid (2.00-6.00 in/hr) **rapid (6.00-20.00 in/hr)**
very rapid (>20.00 in/hr)

**** Area from which no or very little water escapes by overland flow**

Table 2 - Subsurface Drainage Potential

Depth to Seasonal High Water Table (feet)	Soil Drainage Class						
	very poorly drained	poorly drained	somewhat poorly drained	moderately well drained	well drained soils	somewhat excessively drained	excessively drained
0-1	H	VH	VH	VH	VH	VH	
1-3	M	M	M	M	H	H	H
3-6	L	L	L	L	M	M	M
>6		VL	VL	L	L	L	L
Artificial Subsurface Drainage (any depth)	H	H	H	H			

VL = very low **L = low** **M = medium** **H = high** **VH = very high**